April 29, 1841.

Sir JOHN WILLIAM LUBBOCK, Bart., V.P. and Treasurer, in the Chair.

The Right Honourable Lord Monteagle, the Right Honourable Earl de Grey, the Right Honourable Lord Wrottesley, and Charles Woodward, Esq., were balloted for and duly elected into the Society.

The following papers were read, viz.—

1. "On the proportions of the prevailing Winds, the mean Temperature, and depth of Rain in the climate of London, computed through a cycle of eighteen years, or periods of the Moon's Declination." By Luke Howard, Esq., F.R.S., was resumed and concluded.

In this paper the author investigates the periodical variations of the winds, rain and temperature, corresponding to the conditions of the moon's declination, in a manner similar to that he has already followed in the case of the barometrical variations, on a period of years extending from 1815 to 1832 inclusive. In each case he gives tables of the average quantities for each week, at the middle of which the moon is in the equator, or else has either attained its maximum north or south declination. He thus finds that a north-east wind is most promoted by the constant solar influence which causes it, when the moon is about the equator, going from north to south; that a south-east wind, in like manner, prevails most when the moon is proceeding to acquire a southern declination; that winds from the south and west blow more when the moon is in her mean degrees of declination, going either way, than with a full north or south declination; and that a north-west wind, the common summer and fair weather wind of the climate, affects, in like manner, the mean declination, in either direction, in preference to the north or south, and most when the moon is coming north.

He finds the average annual depth of rain, falling in the neighbourhood of London, is 25·17 inches.

From his observations on the temperature, he deduces the following conclusions:—1. That the pressure of an atmospheric tide, which attends the approach of the moon to these latitudes, raises the mean temperature 0·35 of a degree. 2. That the rarefaction under the moon in north declination lowers the temperature 0·13 of a degree. 3. That the northerly swell following the moon as she recedes to the south further cools the air 0·18 of a degree. 4. That this cold continues while the moon is away south, reducing the mean temperature yet lower by 0·04 of a degree.

2. "A new Method of solving Numerical Equations." By Mr. Thomas Weddle, of Stamfordham. Communicated by S. H. Christie, Esq., M.A., Sec. R.S.

The object of this paper is to develope a new and remarkably simple method of approximating to the real roots of numerical equations, which possesses several important advantages. After describing the nature of the transformations which are subsequently

employed, the author proceeds to develope the process he uses for obtaining one of the roots of a numerical equation. Passing over the difficult question of determining the limits of the roots, he supposes the first significant figure (R) of a root to have been ascertained, and transforms the proposed equation into one whose roots are the roots of the original, divided by this figure $\left(\text{or } \frac{x}{R}\right)$: one root of this equation lying between 1 and 2, the first significant figure (r) of the decimal part is obtained, and the equation transformed into another whose roots are those of the former, divided by $1+$ this decimal (or $1+r$). This last equation is again similarly transformed; these transformations being readily effected by the methods first given. Proceeding thus, the root of the original equation is obtained in the form of a continued product. After applying this method to finding a root of an equation of the 4th, and likewise one of the 5th degree, the author applies it to a class of equations to which he considers it peculiarly adapted, namely, those in which several terms are wanting. One of these is of the 16th degree, having only six terms; and another is of the 622nd degree, having only four terms.

3. "Additional Note on the Contraction of Voluntary Muscles in the living body." By William Bowman, Esq., F.R.S., Demonstrator of Anatomy in King's College, London, and Assistant Surgeon to King's College Hospital.

This communication contains a short account of some recent examinations made by the author on the human muscular fibre affected by tetanus. The effect of the violent contractions which characterize this disease, is to produce, in many parts of the muscles, considerable ecchymosis, which gives the contiguous portions a pale and gray aspect. In other places the muscles lose, in a great measure, their fine fibrous character, and exhibit a soft mottled surface, which is easily torn. The primitive fasciculi, when microscopically examined, present indications of strong contraction, appearing swollen into a fusiform shape, and having their transverse striæ in some parts much more closely approximated, and in others separated to much greater distances than in the natural state, or even altogether obliterated, in consequence of the whole texture being broken up into those primitive elements of which the discs are constructed; and frequently they are broken across without a corresponding rupture of the sarcolemma.

The author is led from his observations to the conclusions,—1st, that the contraction of a muscle is the essential cause of its rupture, 2ndly, that there is no repellent force between the contractile elements of muscular fibre; and, lastly, that the contraction of voluntary muscle is not a sustained act of the whole congeries of contractile elements composing it, but a rapid series of partial acts, in which all duly share, becoming by turns contracted and relaxed.

The paper is accompanied by drawings of the microscopic appearances therein described.